



Armed Forces College of Medicine AFCM



Histological Structure of Oral Cavity

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INTENDED LEARNING OBJECTIVES (ILO)



By the end of this lecture the student will be able to:

- Describe the histological structure of oral mucosa, lip, cheek, tongue, palate, and pharynx.
- Correlate the histological structure of oral mucosa, lip, cheek, tongue, palate, and pharynx to their functions
- Interpret the altered microscopic structure of the oral mucosa in different diseases.

Key points of this lecture

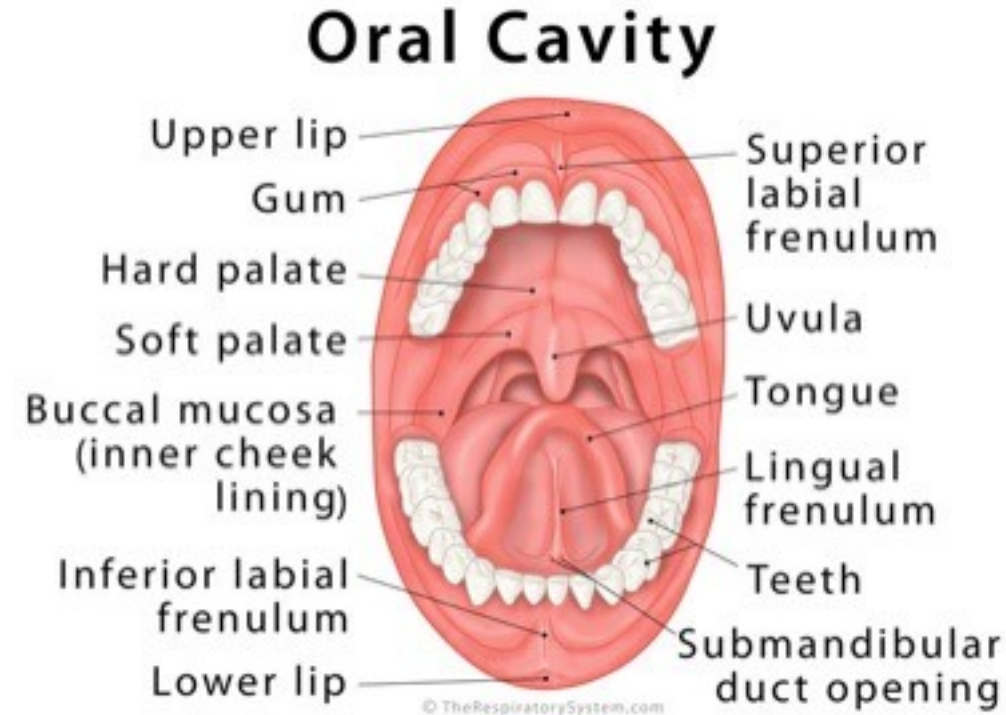


- Types of oral mucosa and their lining epithelium.
- Histological structure of the lip and tongue, palate and pharynx & their changes or defects in different diseases.

The Oral Cavity



- Lined with stratified squamous epithelium, which may be keratinized, or non-kerat. depending on the location.
- The flattened superficial cells of the oral epithelium undergo continuous desquamation.



www.therespiratorysystem.com

- Throughout the oral cavity, the epithelium contains transient antigen-presenting cells and rich sensory innervation.

Types of oral mucosa:

1- Masticatory mucosa: in gingiva & hard palate (areas of friction).

- St. Sq. kerat. epith. Lying directly on periosteum.

2- Lining mucosa. In lips, cheeks, floor of mouth, soft palate & pharynx.

- St.sq. non ker. Epith. For protection.
- Submucosa with minor salivary glands, and diffuse lymphoid tissue).



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Structure of the Lip



Outer Thin skin:

Epidermis: stratified sq. kerat. epith.

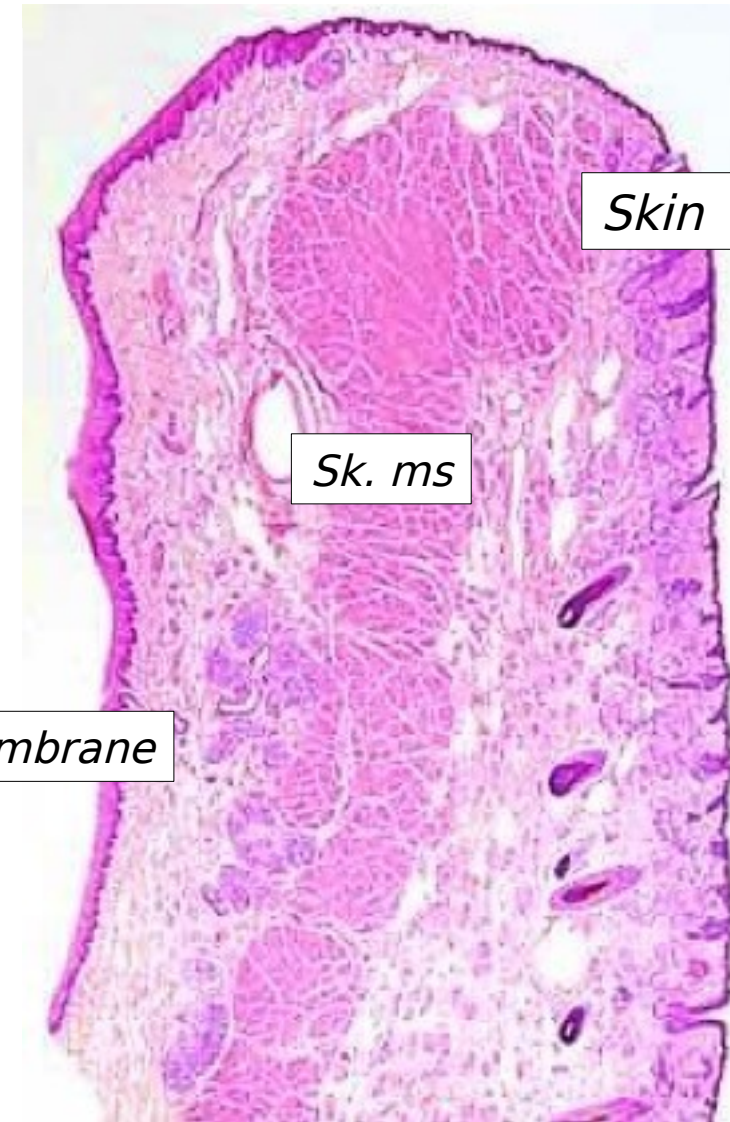
Dermis: Loose C.T. with hair follicles, sebaceous gl. and sweat gl.

Orbicularis oris ms: A well developed core of circular **skeletal muscle** fibers.

Internal mucous membrane:

- **Epithelium:** Thick stratified sq. non-k. ep.

- **Lamina propria:** loose C.T. containing labial glands (mainly mucous acini).

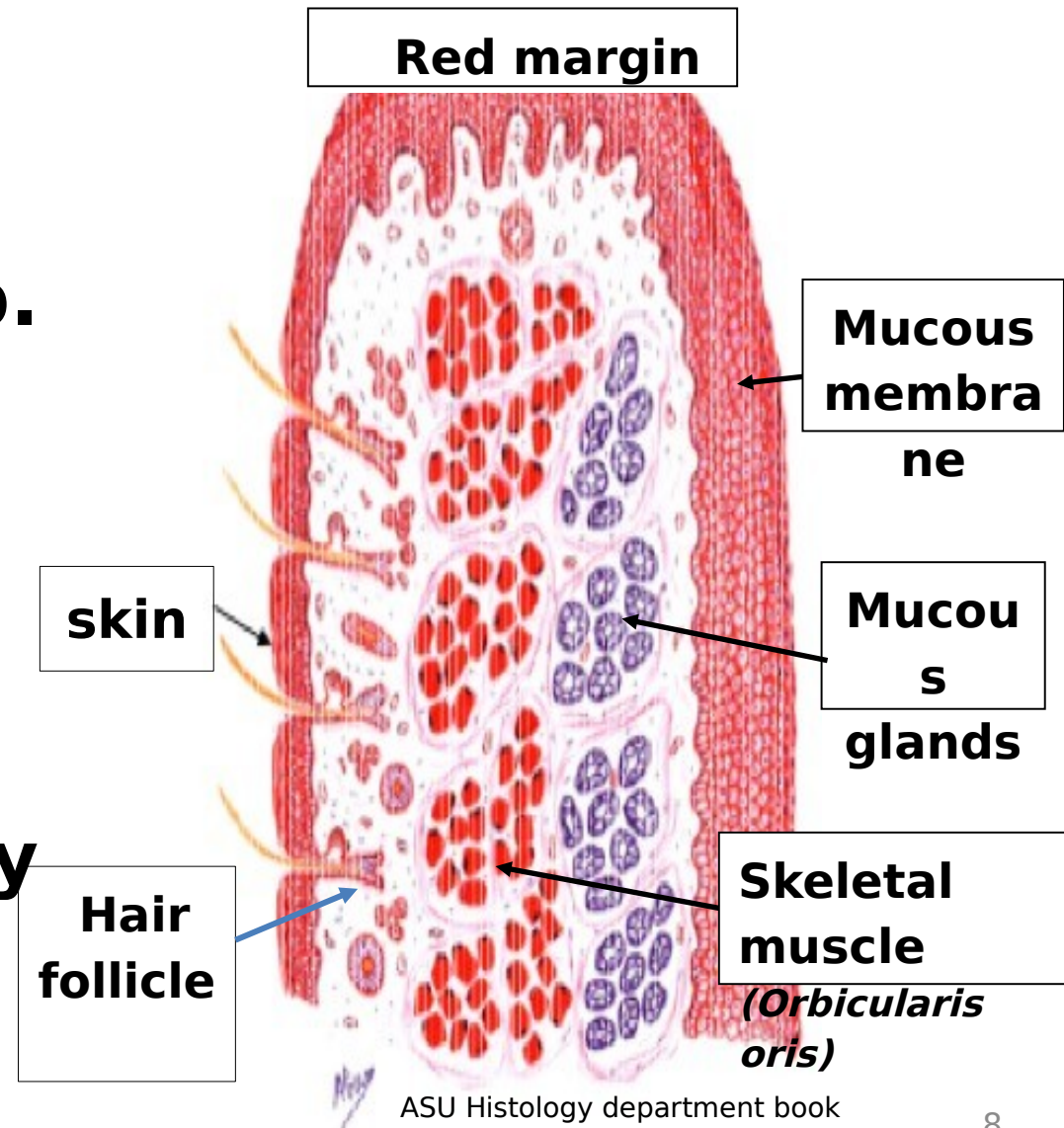


Vermilion zone (red margin):

1- Modified skin

- Very thin St. sq. kerat. ep. (**transparent**).
- No sweat nor salivary glands.
- No hair follicles.
- No sebaceous glands.

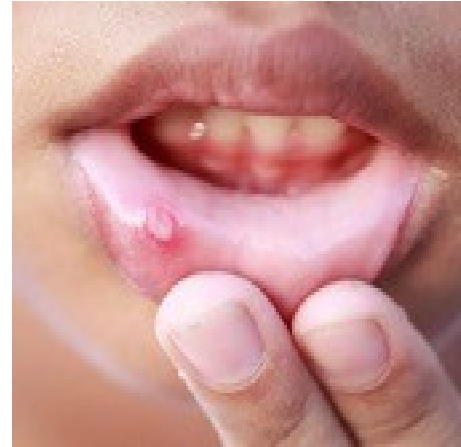
2- Numerous deep highly vascular dermal papillae pink color.



Clinical appl Canker & cold sores

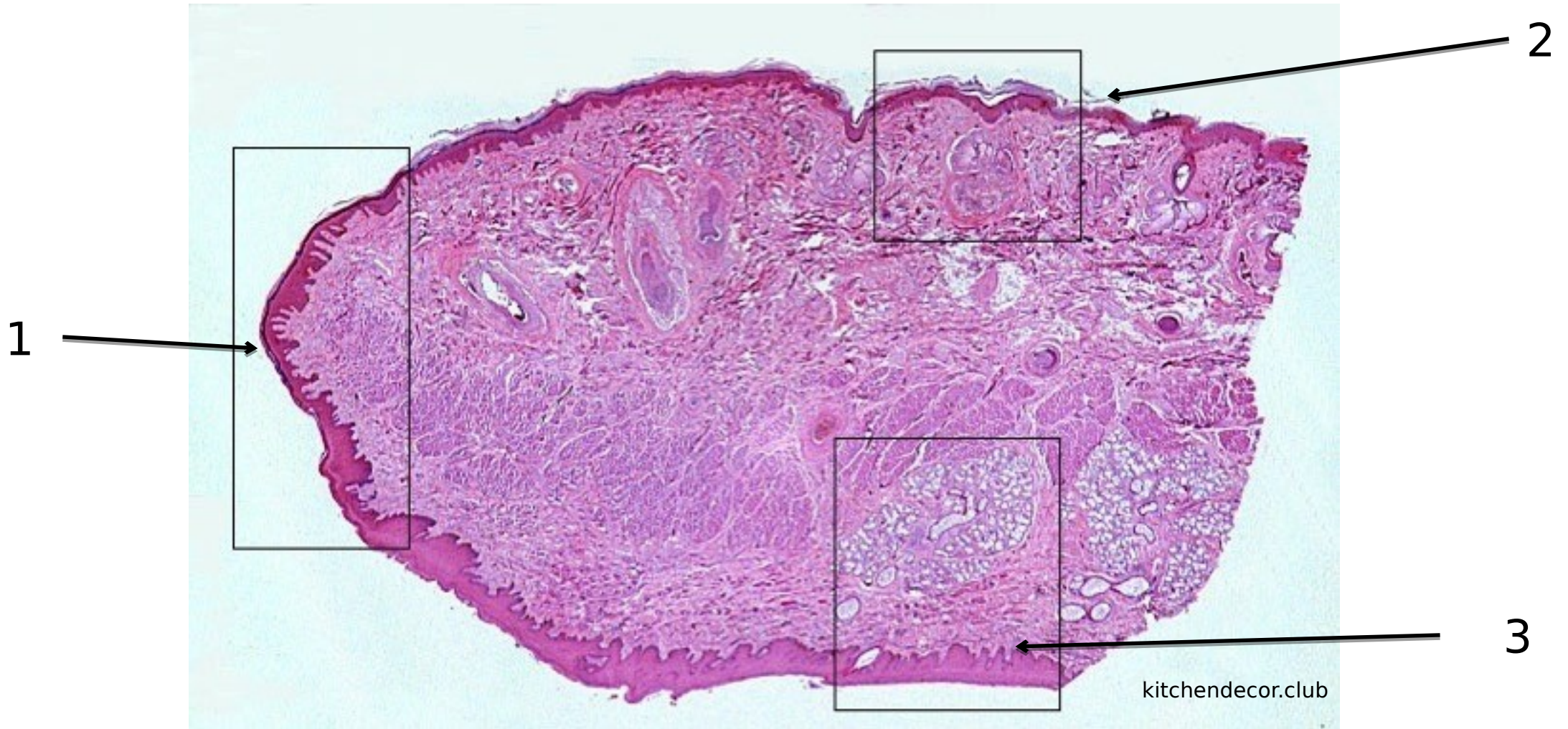


- These are painful, clustered vesicular or ulcerating lesions of the oral mucosa or skin near the mouth.
- In the **oral cavity** such areas are called **canker sores**, and on **the skin**, they are usually called **cold sores or fever blisters**.
- **Causes of cold sores:**
Weak immune defenses due to emotional stress, fever, illness, or local skin damage, allowing the **Herpes Simplex virus**, present in local nerves, to move into the epithelial cells.....death of



Medicinenet.com

QUIZ



QUIZ



A 27 years old female went to the plastic surgeon for lip augmentation. The surgeon suggested injection of the lip by hyaluronic acid filler. Which of the following is a unique structural characteristic of the injected part?

- a) Poor sensory innervation
- b) Absence of sweat glands
- c) Numerous hair follicles
- d) Scanty blood capillaries
- e) Thick epidermis

Tongue

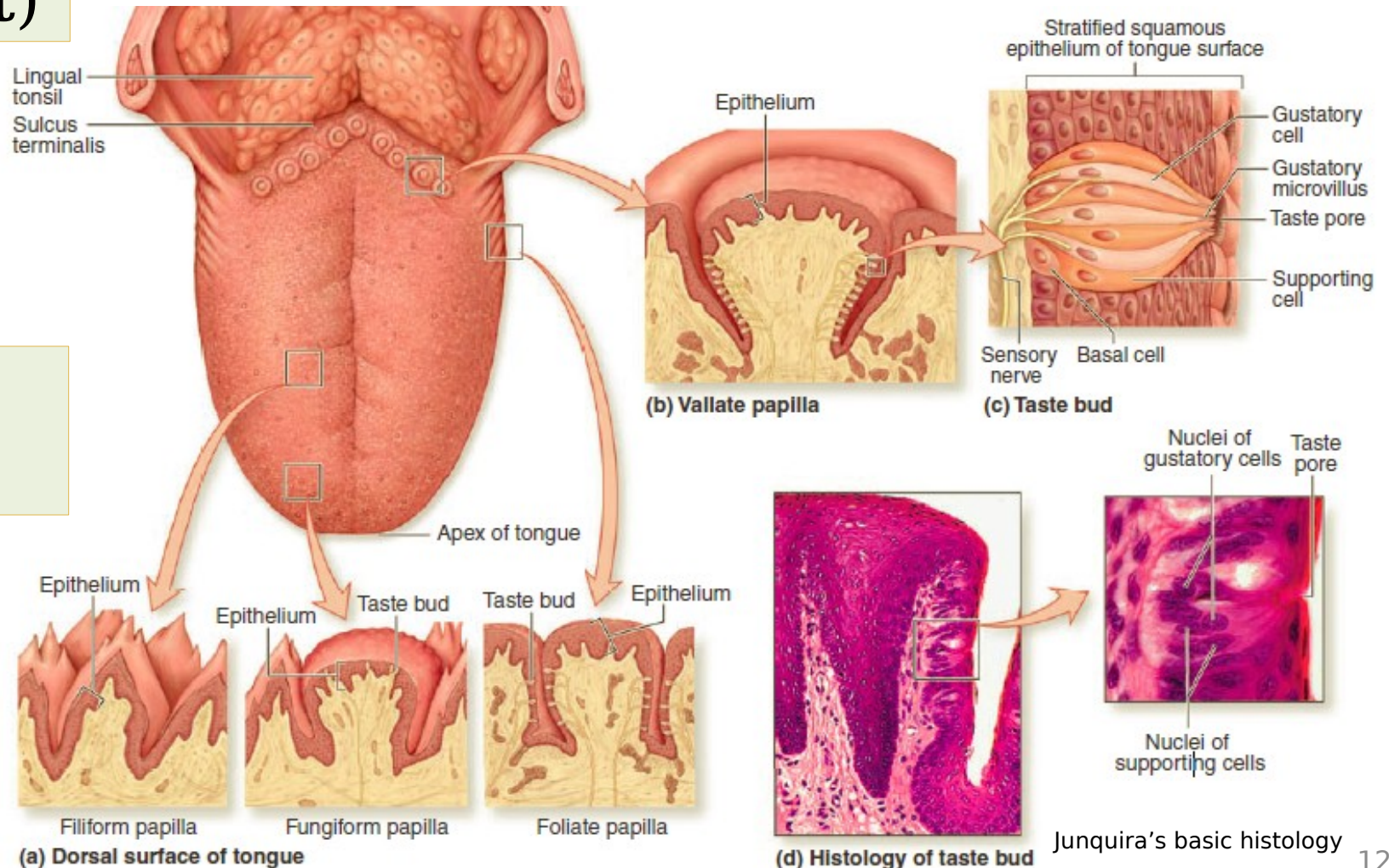


Posterior 1/3 (pharyngeal part)

Contains lingual tonsils

Anterior 2/3 (oral part)

Contains lingual papillae



Tongue



Dorsal surface

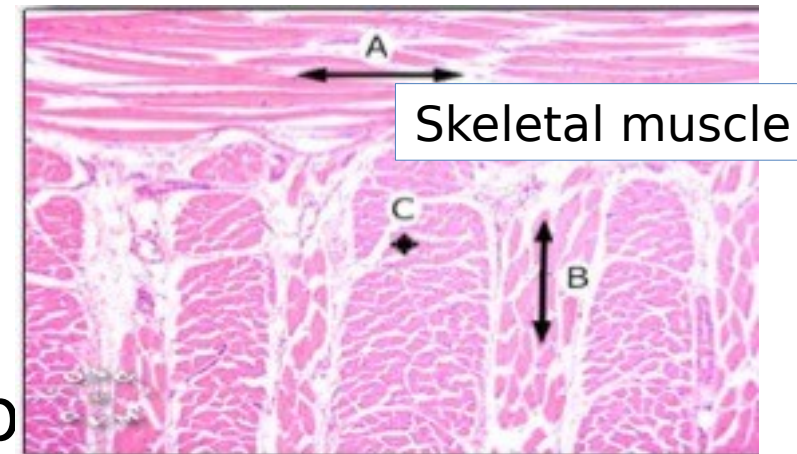
Rough, shows lingual papillae anteriorly and lingual tonsils posteriorly, separated by a V-shaped groove called the **sulcus**

Striated muscle

Arranged in 3 **perpendicular** directions;
longitudinal, transverse and
vertical.

Smooth surface, lined by st. sq. non kerat. Ep

lingual glands (serous, mucous and mixed acini).



instruction.cvhs.okstate.edu

Lingual papillae



They are mucous membrane elevations including epithelium & lamina propria.

Types of lingual papillae:

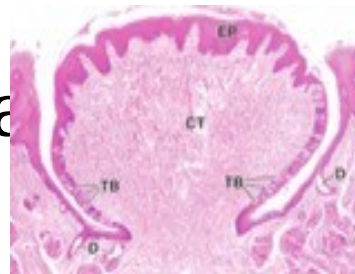
- **Filiform** papillae
- **Fungiform** papillae
- **Circumvallate** papillae
- **Foliate** papillae



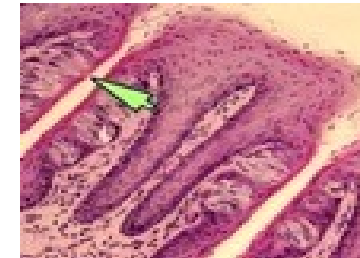
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medicalhistology.us

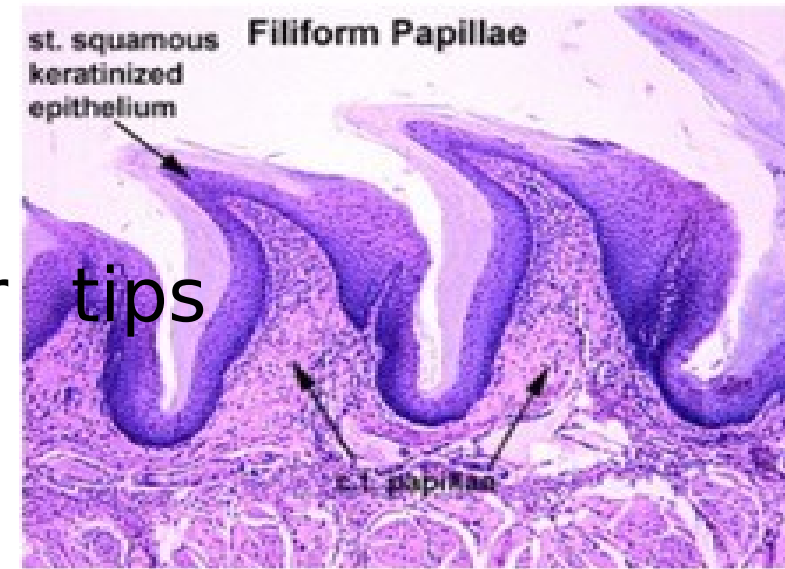


siumed.edu

1- Filiform papillae



- Numerous on ant. 2/3. of tongue
- Elongated conical shape with their tips pointing backwards.
- Heavily keratinized → grey or whitish appearance.
- No taste buds.
- Provides rough surface that facilitates food movement during chewing.

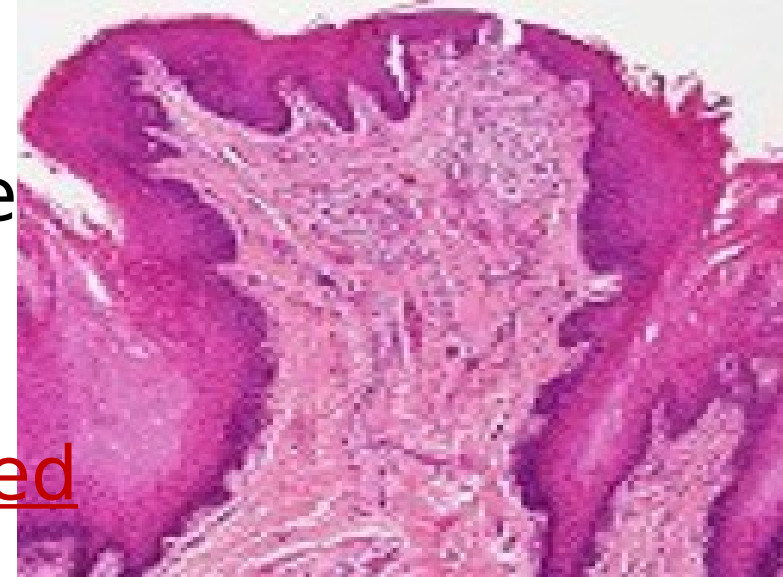


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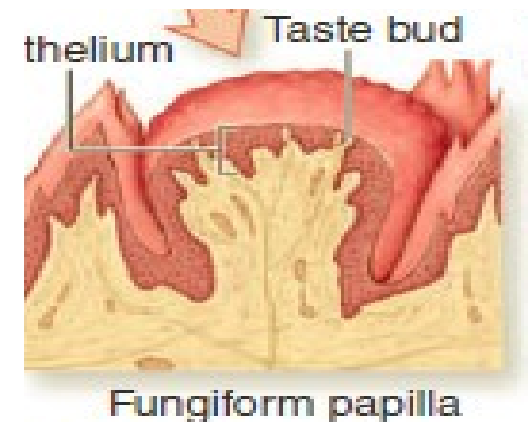
2- Fungiform papillae



- Few, scattered across the dorsal surface
- Mushroom-shaped
- Lightly keratinized, well vascularized (red spots).
- Few Taste buds on their upper surface.
- For taste sensation.



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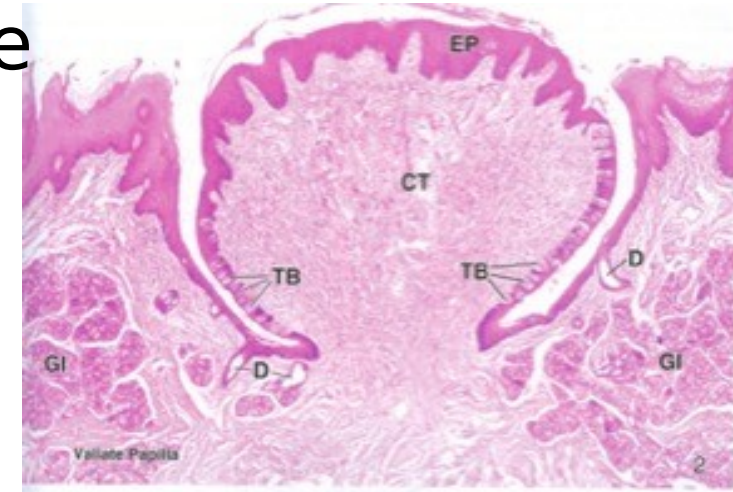
3- Circumvallate papillae



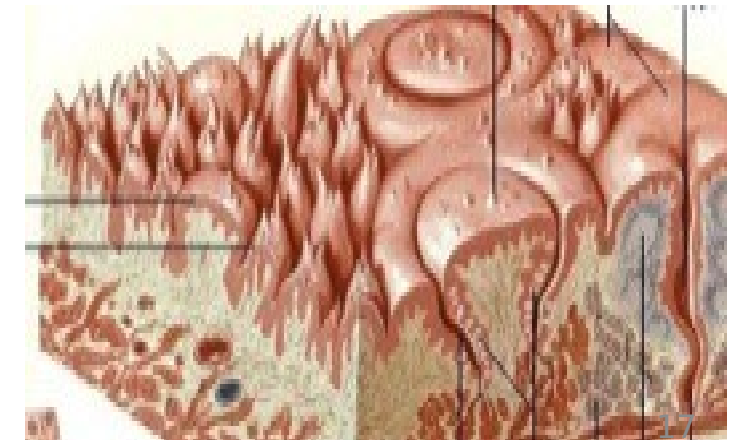
- **Largest** papillae, 8 -12 in number, lies in a V-shape line just anterior to the sulcus terminalis.
- **Abundant taste buds** (250) on the lateral sides.
- Surrounded by **circular deep grooves** continuously flushed by the **serous** secretion of **Von Ebner's glands**



Clear the grooves which encircle the papillae and contains **lipase** enzyme
(Prevents formation of a hydrophobic film that would hinder gustation)



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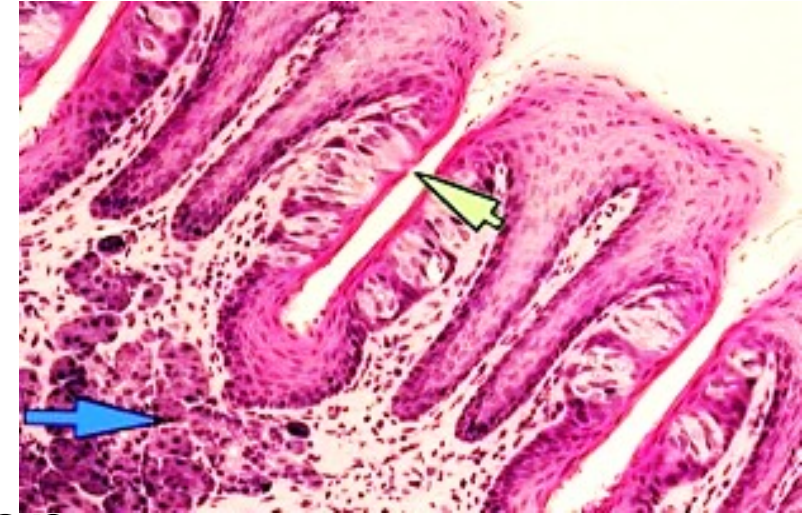


slideshare.net

4- Foliate papillae



- More in young persons, and rudimentary in old age.
- On sides the tongue.
- Several parallel ridges separated by deep grooves.
- Von Ebner's glands are present in the lamina propria
- Numerous taste buds on the sides.



.siumed.edu

QUIZ



On a piece of paper, draw the following types of papillae as fast as you can

Filiform papillae

Circumvallate papillae

QUIZ



A histologist was assigned to examine a box filled of unlabeled stained slides of the GIT. Which of the following uniquely characterizes a slide containing the lingual muscle?

- a) Being formed of smooth fibers.
- b) Branching and anastomosing fibers.
- c) Covered by simple columnar epithelium.
- d) Present in the anterior part of the tongue.
- e) Running in three perpendicular directions.

QUIZ



On examining a biopsy of tongue, which of the following is a characteristic histological feature for the type of papillae that facilitate chewing of food?

- a) Appear rounded in outline
- b) Contains numerous taste buds
- c) Cover the posterior $\frac{2}{3}$ of the tongue
- d) Covered with kerat. st. sq. epithelium.
- e) Present on the sides and tip of tongue

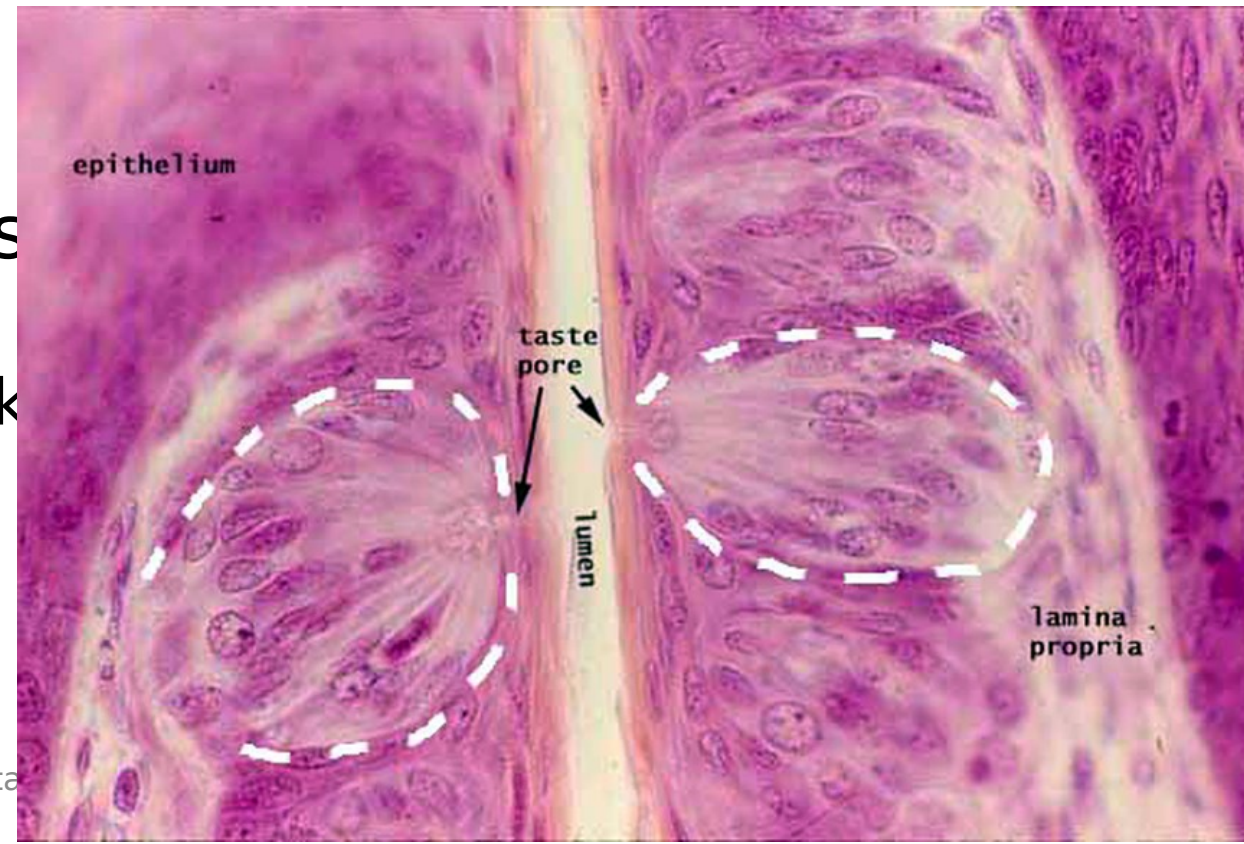
Taste Buds



- **Site:** dorsal surface of the tongue, soft palate, pharynx, epiglottis.
- **Structure:**

Oval-shaped, rest on the basement membrane with an apical taste pore.

- Each taste bud is formed of:
 - 1- **Neuroepithelial** cells (light cells)
 - 2- **Supporting** cells (dark cells)
 - 3- **Basal** stem cells



Taste buds



cells):

- Elongated columnar cells with apical microvilli projecting from the taste pore.
- Free nerve endings contact their basal surface.

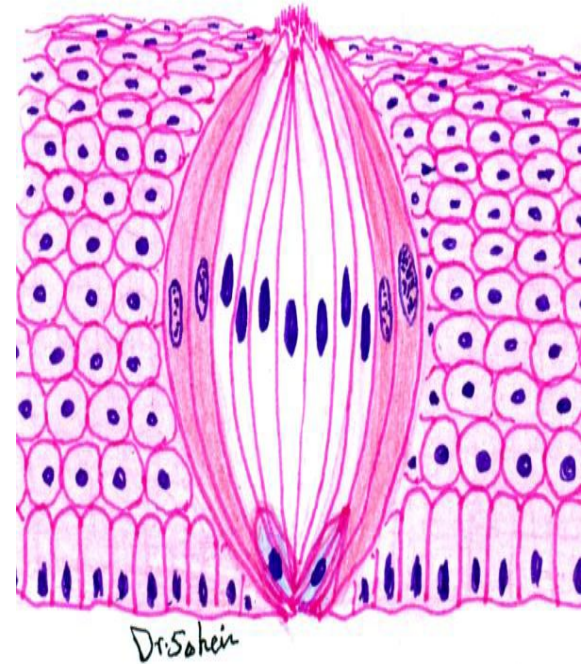
2- Supporting cells:

- Peripherally located elongated columnar cells.
- Support and secrete an amorphous material which surrounds the microvilli.

3- Basal cells:

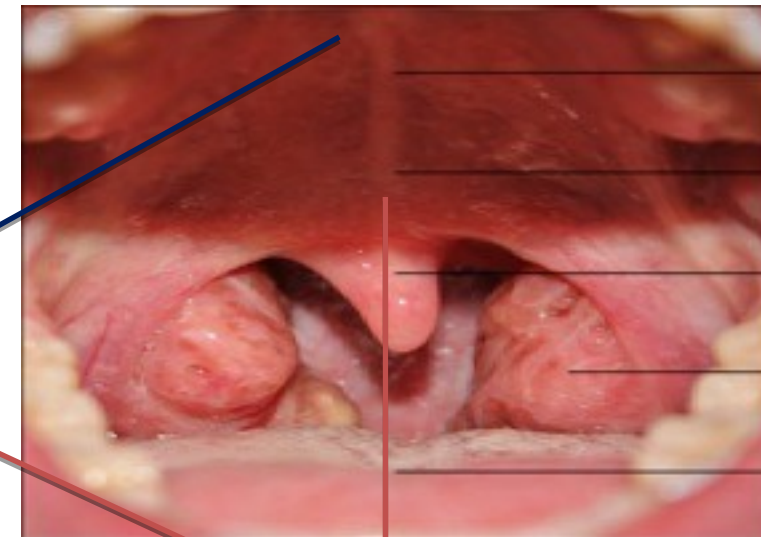
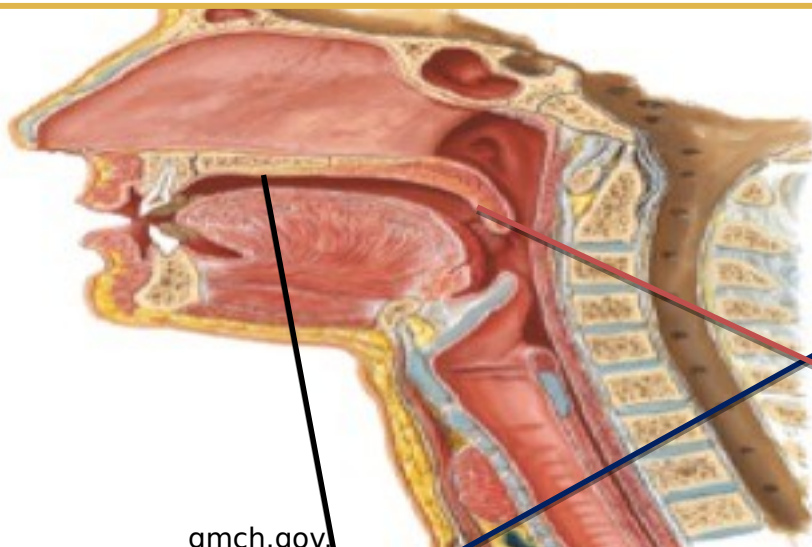
Stem cells present near the base of the taste buds.

- They give rise to the other types of cells of the taste bud. Their life span is about **7-10**



ASU Histology department book

Palate



gmch.gov.in

Soft Palate

shutterstock.com

Hard Palate

Posterior $\frac{1}{3}$ of roof

Movable (**skeletal muscles**) *it prevents food from being pushed up into the nasal cavity.*

Inferior oral part is lined with st. sq. non-K. ep.

Superior nasal part is covered with

Anterior $\frac{2}{3}$ of roof

Immovable (**Bone**)

Keratinized st. sq. epith adherent to bone

Pharynx



1-Nasopharynx:

- Lined with pseudostratified ciliated columnar ep. with goblet cells

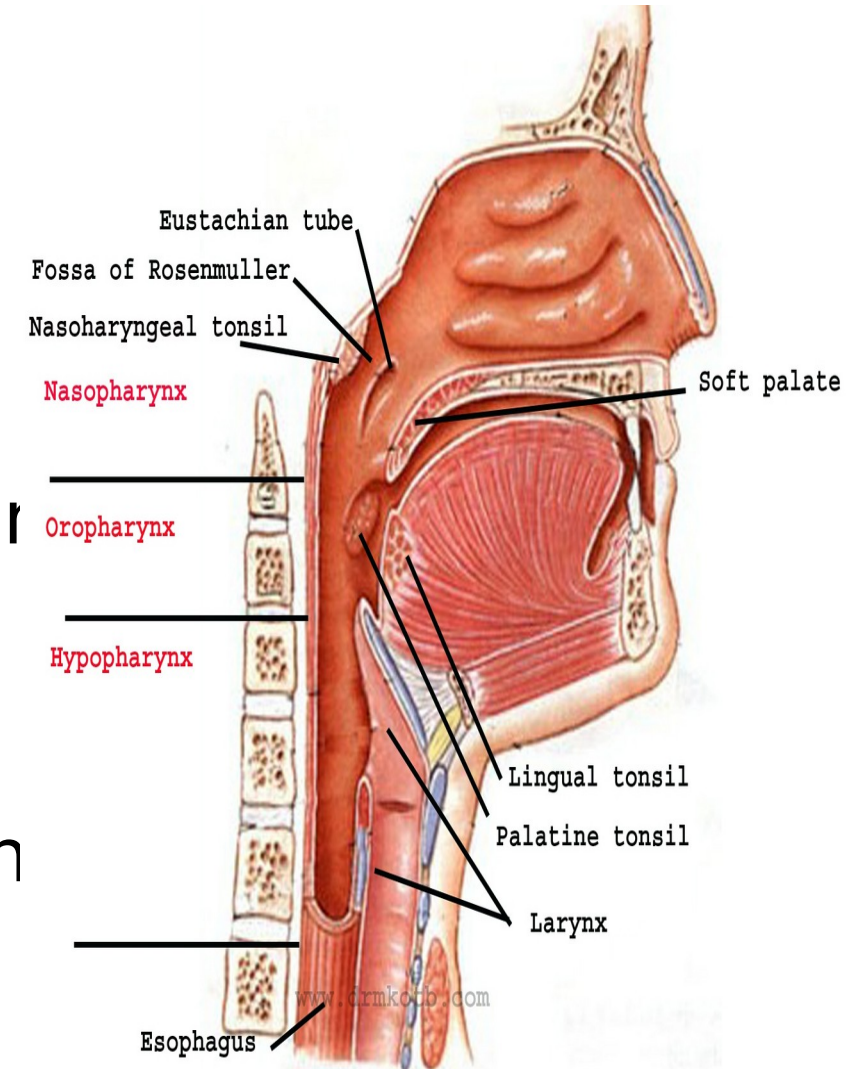
- Lamina propria contains **pharyngeal tonsils**.

- Lined with stratified squamous non kerat. ep

- Lamina propria contains **palatine tonsils**.

3-Laryngopharynx

lined by stratified squamous non keratinized ep.



QUIZ

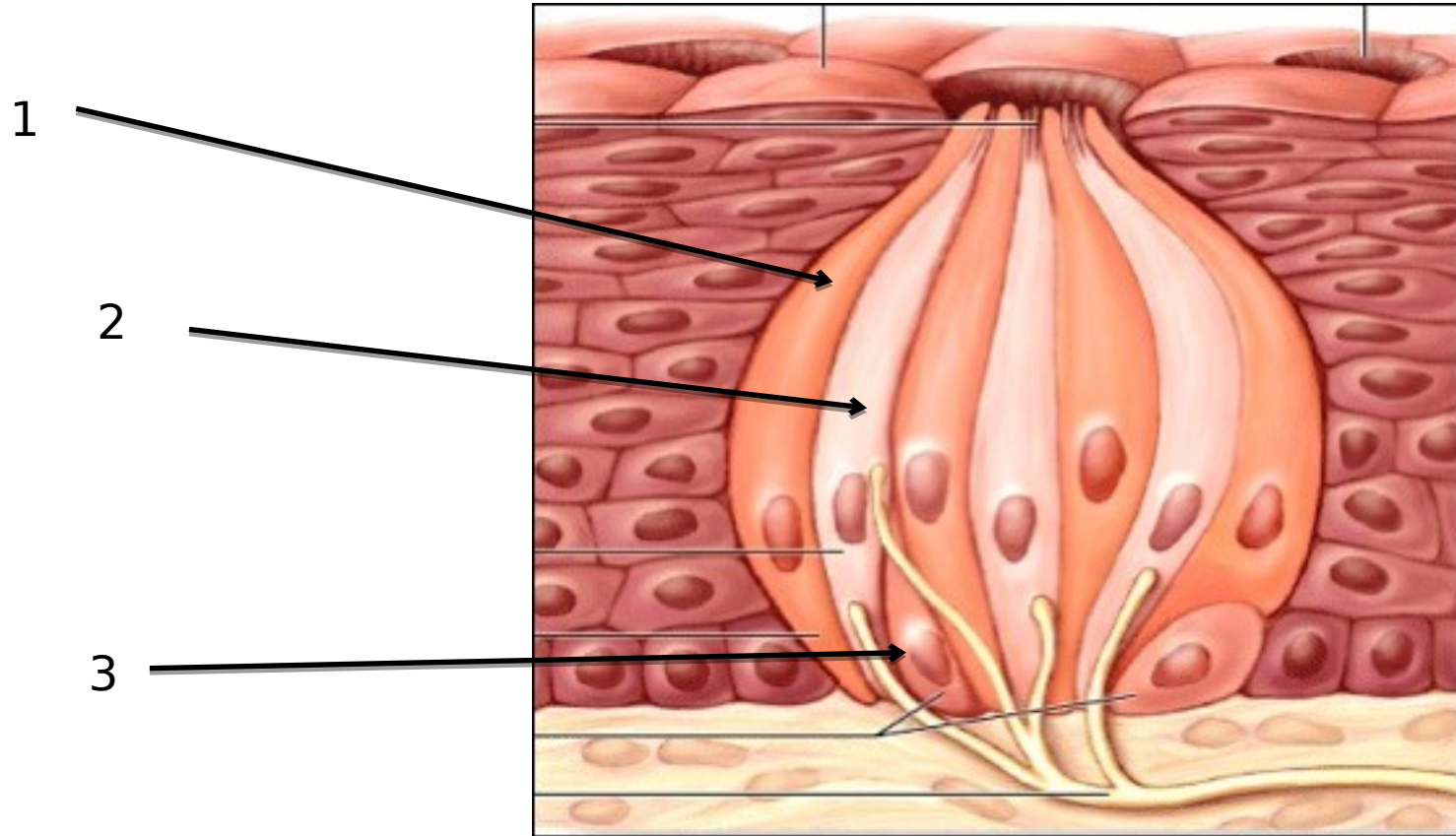


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QUIZ



In which of the following structures of the oral cavity would taste buds be localized in the highest concentration?

- a) Gingiva
- b) Vallate papillae
- c) Filiform papillae
- d) Fungiform papillae
- e) Ventral surface of the tongue

QUIZ



While examining a 60 year old man in a regular checkup, the doctor suspected a lesion in the back of the roof of the mouth, and suggested to take a biopsy. What type of epithelium is expected to be seen on the upper surface of this part?

- a) Stratified squamous keratinized epithelium.
- b) Stratified squamous non keratinized epithelium.
- c) Pseudostratified epithelium with goblet cells.
- d) Stratified columnar epithelium.
- e) Simple columnar epithelium with goblet cells.

Summary



The **oral cavity** is lined primarily by **mucosa** with **nonkeratinized stratified squamous epithelium**, with **keratinized stratified squamous epithelium** on the **hard palate** and **gingiva**.

The dorsal surface mucosa of the tongue has projecting **lingual papillae** of four types: **filiform** papillae with keratinized epithelium and nonkeratinized **foliate**, **fungiform**, and large **circumvallate** papillae.

All lingual papillae, except the filiform type, have epithelial **taste buds** on their sides, with chemosensory **gustatory cells** with synapses to basal sensory innervation, **supporting cells**, and an apical **taste pore**.

Key points of this lecture



- Types of oral mucosa and their lining epithelium.
- Histological structure of the lip and tongue, palate and pharynx & their changes or defects in different diseases.

Suggested textbooks



1- Junqueira`s Basic Histology; Text and Atlas. 15th edition 2018, pp: 298-300.

2- Michael H. Ross and Wojciech Pawlina. Histology atlas and test:, 7th edition, 2015, pp: 572-581



**Thank
You**

Mahalo

Kiitos

Tack

Grazie

Toda

Obrigado

Takk

Thanks

Gracias

Merci